

USSR

UDC 519.2:62-19

BASKIN, E. M. and DEMIN, V. M.

"Evaluations of the Reliability Characteristics of Systems Using a Small Number of Tests"

Tr. VNII elektromekh. (Transactions of the All-Union Scientific Research Institute of Electromechanical Engineering), No 33, 1970, pp 135-148 (from Referativnyy Zhurnal -- Matematika, No 6, June 71, Abstract No 6V287, by Ya. Lumel'skiy)

Translation: A method of arriving at evaluations for the distribution functions  $\Phi(x)$  by expansion according to a system of orthogonal Laguerre polynomials with parameter  $\lambda_p$  is examined.

A study is made of a class S of distributions for which  $\lambda$  is the characteristic

$$\lambda(x) = \frac{f(x)}{1 - \Phi(x)}$$

and as  $x \rightarrow \infty$  this expression has the limit  $\lambda(\infty) \neq 0$ . This

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BASKIN, E. M. and DEMIN, V. M., Tr. VNII Elektromekh, No 33, 1970, pp 135-148

class of distribution S includes the class of laws for obsolescence. Sufficient conditions for the expandibility of the distribution density for different subclasses of the class S are obtained. The second part of the article states the possibility of employing these expansions to approximate a distribution function by sampling characteristics.

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USSR

UDC 629.78:533.6.001.3

BASKIN, V. E.

"Inductive Velocities and Sonic Pressure Perturbations of an Arbitrarily Moving Supporting Thread in a Gas"

Uch. zap. Tsentr. aerogidrodinam. in-ta (Scientific Notes of the Central Institute of Aerodynamics), 1972, Vol 3, No 4, pp 1-8 (from RZh-Raketostro-  
yeniye, ot del'nyy vypusk, No 12, Dec 72, Abstract No 12.41.115)

Translation: The auxiliary concept of a supporting thread is used to investigate flow of a gas around bodies within the framework of linear theory. The sonic pressure fields and inductive velocities during curvilinear non-stationary movement of a supporting thread with subsonic velocities are investigated in the linear statement. There are 2 illustrations and a 6-entry bibliography.

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USSR

UDC: 533.69.01+533.662.013

BASKIN, V. E.

"On the Theory of Nonstationary Curvilinear Motion of a Supporting Surface in a Gas"

Uch. zap. Tsentr. aero-gidrodinam. in-ta (Scientific Works of the Central Aero-hydrodynamic Institute), 1970, 1, No 2, pp 18-28 (from RZh-Mekhanika, No 9, Sep 70, Abstract No 9B369)

Translation: Nonstationary curvilinear motion of a supporting surface in a gas is considered within the framework of the linear theory. A formula is derived for gas velocities induced by a supporting surface with a given finite surface load moving arbitrarily in the gas. This formula generalizes the Biot-Savart relation to the case of a compressible fluid. The generalization consists in the fact that the Biot-Savart formula need be applied only to those elements of the vortices from which acoustic signals have had time to reach the points of application. Additional "wave" components of the velocities appear which decrease as the first power of the distance from the vortices. Application of the results of the work is illustrated by two examples. A. F. Kryuchin.

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~~BASKINA, N. F.~~, Scientific Worker at the Neurophysiological Laboratory of the Psychoneurological Institute imeni V. M. Bekhterev, and OZERNAYA, Ye., Sotsialisticheskaya Industriya correspondent

"Silver Crowns"

Moscow, Sotsialisticheskaya Industriya, 12 Mar 72, p 4

Translation: Have you ever seen an ordinary cat wearing a splendid "royal crown"? No? Then let us go to the neurophysiological laboratory of the Psychoneurological Institute imeni V. M. Bekhterev.

"Are you surprised at these 'royal cats'?" Senior scientific worker at the laboratory, Nina Fedorovna Baskina, asked, smiling. "They are wearing crowns in order to serve science."

Nina Fedorovna took Murat in her hands and put him into a glass box. The cat underwent this procedure without a murmur. After 20 seconds, however, he suddenly became uneasy, jumped from his place, his hair stood up, his tail curled and fluffed up like that of a squirrel, his eyes began to sparkle like lightning, he tensed up and began to dash furiously around the chamber. In another 20 seconds Murat, as though ashamed of his outburst, calmed down.

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BASKINA, N. F., and OZERNAYA, Ye., Sotsialisticheskaya Industriya, 12 Mar 72,  
p 4

Question: What happened to the cat"

Answer: Every brain cell is a tiny radio station, which can receive any signals. Depending on the brain region to which a stimulus is sent and on the force with which it is sent it is possible to make a starving cat turn away from food, and a cat that is full, devour it, and it is possible to produce fear or a fit of anger.

Is it possible by means of an external effect on specific brain sections to produce an aversion to harmful habits, for example, to alcohol? We set this task for ourselves.

A department for patients suffering from a psychic disorder due to alcoholism was organized in the institute several years ago. As is well known, alcohol, like other narcotics, is among the strongest toxins. It quickly enters the blood and easily penetrates the cells. Its frequent consumption leads to a complete loss of health. The workers at the N. F. Baskin and L. D. Lobastov  
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BASKINA, N. F., and OZERNAYA, Ye., Sotsialisticheskaya Industriya, 12 Mar 72,  
p 4

Laboratory set themselves the goal of finding out the root of the evil and the way to fight it. On the basis of a study of the bioelectrical activity of the brain in patients suffering from chronic alcoholism it was assumed that, in addition to disturbances in the cerebral cortex, there are changes in the functions of deep brain structures. The process of formation of chronic alcoholism had to be observed. Cats were taken for these experiments.

Question: Why precisely these animals?

Answer: There are many reasons. First of all, because cats have an aversion to alcohol without preliminary habituation. (Mice, for example, find nothing unnatural in alcohol). Moreover, there are improved anatomical atlases of the cat's head, and they make it possible to accurately affect the strictly determined brain sections. For this purpose tiny antennas, which form a unique crown, are put on the animal's head. They are made of silver and they make it possible to record the electrical potentials of the brain and to affect the functional state of these brain sections. Thus, we have obtained a record of the electrical activity of a normal animal and only after this we have begun to create the alcohol model.

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BASKINA, N. F., and OZERNAYA, Ye., Sotsialisticheskaya Industriya, 12 Mar 72,  
p 4

Question: You mean to intoxicate cats?

Answer: Yes, in order to obtain in animals the various stages of alcoholism that are observed in man. When given a free choice between water and alcohol, cats drink only water. They had to be accustomed to alcohol. Instead of water we began to give them a 10% solution of ethyl alcohol. Only once in 5 days the cat was offered a choice between water and alcohol. During the first 2 months the animals drank only water. After 2 months they chose alcohol. We gradually increased the alcohol solution up to 20% and gave the cat the possibility of choosing between water and 10% and 20% solutions of alcohol. The animal correctly found and drank the strongest solution. Thus he became an alcoholic. We studied the electrical phenomena in the brain recorded on an electroencephalograph, i.e., a special instrument, and found that, when certain brain sections were stimulated, the cat rushed to drink alcohol without preliminary training.

Question: Did you find that, when other brain sections were stimulated, the cat ran away from alcohol?

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BASKINA, N. F., and OZERNAYA, Ye., Sotsialisticheskaya Industriya, 12 Mar 72,  
p 4

Answer: We found that, when certain brain sections of cats which were hopeless alcoholics were affected, instead of an intensified craving for alcohol, these cats manifested a sharp aversion to it.

Question: When did such a negative reaction to alcohol occur?

Answer: An impulse sent to a cat for 20 seconds produces an aversion to alcohol in 1 or 2 days. A complete course of treatment lasts several sessions.

Question: What are your plans?

Answer: Naturally, these experiments are not designed to have direct application to the treatment of humans. We do not intend to adorn the heads of drunkards with "silver crowns." It is a matter of finding drugs which would replace electrodes, but act upon specific systems in the brain. Luckily, these systems have been found. The search for drugs requires time.

5/5

1/2 015 UNCLASSIFIED PROCESSING DATE--04DEC70  
TITLE--SOVIET ASTRONOMERS CONTINUE WORK AT CHILEAN OBSERVATORY -U-  
AUTHOR--BASKINA, T.  
COUNTRY OF INFO--CHILE, USSR *B*  
SOURCE--MOSCOW, TRUD. 14 MAY 1970, P 4.  
DATE PUBLISHED--14MAY70  
SUBJECT AREAS--ASTRONOMY, ASTROPHYSICS, BEHAVIORAL AND SOCIAL SCIENCES  
TOPIC TAGS--ASTRONOMIC OBSERVATORY, ASTROMETRY, CATALOG, FOREIGN TECHNICAL  
RELATION  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY FICHE NO----FD70/605026/C05 STEP NO--UR/9025/70/000/000/0004/0004  
CIRC ACCESSION NO--AN0141512  
UNCLASSIFIED

2/2 015

UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AN0141512

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. FOR SEVERAL YEARS NOW PULKOVO ASTRONOMERS HAVE BEEN COOPERATING WITH THEIR CHILEAN COLLEAGUES AT THE CERRO CALAN OBSERVATORY IN CHILE. THEIR TASK INCLUDES THE DETERMINATION OF THE EXACT POSITIONS OF APPROXIMATELY 1,000 BRIGHT STARS AND 12,000 FAINT STARS. THIS WILL MAKE IT POSSIBLE TO COMPILE A MORE COMPLETE CATALOGUE WHICH WILL ENCOMPASS THE SKIES OF THE EARTH'S TWO HEMISPHERES. THIS FUNDAMENTAL TASK WAS SUGGESTED BY THE INTERNATIONAL ASTRONOMICAL UNION. THE CATALOGUE WILL BE IMPORTANT NOT ONLY FOR THE FIELD OF ASTRONOMY BUT ALSO FOR GEODESY, CARTOGRAPHY AND THE TIME SERVICE AS WELL AS FOR MARINE, AIR AND SPACE NAVIGATION.

UNCLASSIFIED

2/2 027 UNCLASSIFIED PROCESSING DATE--30OCT70  
 CIRC ACCESSION NO--AP0119441  
 ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. MEASUREMENTS OF COKE SURFACES BY BENZENE ADSORPTION ARE LOWER THAN BY KR BECAUSE SOME OF THE COKE PORES ARE INACCESSIBLE TO THE LARGE BENZENE MOLES. THE AR ATOM IS SMALLER, WITH A SOLID MONOLAYER SURFACE OF 15.4 ANGSTROM PRIME2; IT PROVIDES A MORE EXACT SURFACE MEASUREMENT THAN N AS DETD. CHROMATOGRAPHICALLY AND STATISTICALLY. A DETECTOR WAS USED FOR DETG. THERMAL COND. AND AN AUTOMATIC RECORDING POTENTIOMETER FOR CHROMATOGRAPH (TSVET). AT MINUS 195DEGREES, THE AR WAS ADSORBED BY THE COKE. THE COKE SAMPLE WAS THEN HEATED TO ROOM TEMP., THE AR DESORBED AND THE POTENTIOMETER RECORDED A CHANGE IN THE MIXT. COMPN. AS A DESORPTION PEAK. THE PEAK DURATION WAS SIMILAR TO 1 MIN AT A RATE OF GAS FLOW OF 60ML-MIN. THE ADSORPTION DESORPTION CYCLE CONTINUED FOR SIMILAR TO 10 MIN. EXPRESSIONS ARE SUBMITTED FOR THE INTERNAL SP. SURFACE, IN TERMS OF MATERIAL QUANTITY ADSORBED BY THE MONOMOL. LAYER, AND FOR CALCN. OF THIS QUANTITY. METHODS ARE ALSO GIVEN FOR DETG. THE VOL. OF THE ADSORBED AR AND THE PEAK SURFACES. THESE DETNS. WERE SIMPLER, SHORTER AND MORE SENSITIVE THAN BY FORMER METHODS. THE SURFACE VALUES DEPENDED MORE ON THE COKING PROCESS, E. G., HEATING RATE AND FINAL TEMP., THAN ON POROSITY. THE SURFACES VARIED FROM 0.62 M PRIME2-G FOR 1268DEGREES, WITH A 51.3PERCENT POROSITY TO 1.00 FOR 1372DEGREES, WITH A 52.6PERCENT POROSITY, RESP.

1/2 027 UNCLASSIFIED PROCESSING DATE--30OCT70  
 TITLE--CHRCMATOGRAPHIC DETERMINATION OF THE SPECIFIC SURFACE OF COKE ACCORDING TO THE THERMAL DESORPTION OF ARGON -U-  
 AUTHOR-(03)-SKLYAR, M.G., BASKINA, YE.B., MARIYCH, L.I.

COUNTRY--RUSSIA APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002200310017-5"

SOURCE--KOKS KHIM. 1970, (3), 21-3

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--COKE, CHROMATOGRAPHY, ARGON, KRYPTON, NITROGEN, LOW TEMPERATURE EFFECT, POROSITY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
 PROXY REEL/FRA--1997/0522

STEP NO--UR/0068/70/000/003/0021/0023

CIRC ACCESSION NO--AP0119441

UNCLASSIFIED

USSR

BAKIYEV, S. A., BASKOVA, K. A., VASIL'YEV, S. S., MOKHSEN, M. A., SOROKIN, A. A., CHUGAY, T. V.; Institute of Nuclear Physics of Moscow State University

"Concerning  $0^+$  Levels in the  $Xe^{130}$  Nucleus"

Moscow, Yadernaya Fizika, Vol 18, No 2, Aug 73, pp 233-238

Abstract: The  $\beta$ -spectrum of  $Cs^{130}$  was measured on a spectrometer with an Si(Li) detector. A peak identified as the K-line of conversion electrons of the E0 transition with energy of 2016 kev was observed in the region of the upper boundary of the  $\beta$ -spectrum at an electron energy of about 1982 kev. On the basis of this level, quantum characteristics  $I^\pi = 0^+$  are assigned to the 2016 kev level of  $Xe^{130}$ .

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USSR

UDC 581.19

MARKAROVA, Ye. N., and BASLAVSKAYA, S. S., Moscow State University imeni M. V. Lomonosov

"Relationship Between Polyphosphate Biosynthesis and Oxidative Phosphorylation in Cells of *Scenedesmus obliquus* (Turpin) Kützing"

Moscow, Doklady Akademii Nauk SSSR, Vol 193, No 3, pp 709-712

Abstract: Previous studies have indicated that the synthesis of polyphosphates in algae may be related to different respiratory systems. In the present paper, the relationship between this biosynthetic process and phosphorylation during endogenous respiration (respiration due to an intercellular substrate) is discussed. Experiments were conducted using a culture consisting primarily of cells in the growth stage, the period during which polyphosphate synthesis takes place. Acid-insoluble polyphosphates predominate, and respiration proceeds in an essentially glycolytic manner. Fresh nutrient solution without phosphorus was used after 25-30 days.  $P^{32}$  in the form of  $NaH_2P^{32}O_4$  was used in the phosphorus-containing medium. The polyphosphates formed were subjected to careful fractionation. In one test series, absorption of  $P^{32}$  from the test medium in the dark was studied. In a second series, it was found that formation of acid-insoluble polyphosphates

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MARZAROVA, Ye. N., et al, Doklady Akademii Nauk SSSR, Vol 193, No 3, pp 709-712

took place in the absence of inhibitors, whereas no such activity develop in the presence of inhibitors (2,4-dinitrophenol; moniodoacetic acid). For *Sc. obliquus* cells in the growth phase, it was established that, in darkness, when respiration proceeds at the expense of the endogenic substrate, new formation of polyphosphates depends on phosphorylation with electron transport.

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Public Health, Hygiene, and Sanitation

USSR

UDC 614.7:66

POPOV, T., BASMADZHIYEVA, K., KURCHATOVA, DAVIDKOVA, K., and NEYKOVSKA, L.,  
Scientific Research Hygiene Institute, Sofia

"Combined Effect of Chemical Agents That Pollute Air and Water Simultaneously"

Moscow, Gigiyena i Sanitariya, No 12, 1971, pp 77-79.

Abstract: In a two-month experiment, rats were poisoned by simultaneous round-the-clock inhalation of the contact herbicide dinitroorthocresol (DNOC) at the maximum permissible level and by daily ingestion of doses twice the maximum permissible dose. The results of 32 tests (behavior, change in weight, blood inorganic phosphorus, content of sulfhydryl groups, RBC, WBC, hemoglobin, catalase, peroxidase, and cholinesterase activities, and so forth) failed to reveal any functional disturbances in the main organs and systems of the animals. This is attributed to the absence of changes in the balance of energy-rich phosphorus compounds and in the content of sulfhydryl groups. It would appear that brief exposure to DNOC, peroral at a concentration twice the maximum permissible dose and by inhalation at the maximum possible concentration, does not constitute a danger to human health.

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USSR

UDC 5.35.215.1

BASMAN, A. R., GERASIMOV, A. B., DOLIDZE, N. D., KAKHIDZE, N. G.,  
KONOVALENKO, B. M., SHILLO, A. G.

"Concerning 'Photosensitive' Defects in Ge Irradiated at  $T = 77^{\circ} \text{K}$ "

V sb. Radiats. fiz. nemet. kristallov (Radiation Physics of Nonmetallic  
Crystals -- Collection of Works), Vol 3, Part 1, Kiev, "Nauk. dumka,"  
1971, pp 210-216 (from RZh--Elektronika i yeye primeneniye, No 10, October  
1971, Abstract No 10B236)

Translation: Photo-sensitive defects in Ge were studied, which form during  
irradiation of crystals by electrons at  $77^{\circ}\text{K}$ . If after annealing, the  
irradiated crystals are illuminated by white light, then the concentration  
of holes increases and remains constant after cessation of the illumination.  
N-type specimens doped with Sb and As, which changes the type of conductivity  
as a result of irradiation, and also p-type specimens doped with Ga were  
investigated. It is assumed that the effect of the action of light on the  
concentration of holes is the result of a change of the structure of the  
defects during heating and illumination. 3 ill. 6 ref. I. V.

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USSR

UDC 615.33.012.6:697.9427.036.8

MOTINA, G. L., BASMANOV, P. I., and REVIN, A. A., All-Union Scientific Research Institute of Antibiotics, Moscow

"Method of Determining the Effectiveness of Filter Materials for the Sterilization of Air"

Moscow, Khimiko-farmatsevticheskiy Zhurnal, Vol 5, No 12, Dec 71, pp 28-31

Abstract: An experimental technique is described for testing air filter materials based on the standard testing of protective gas mask canisters modified by the use of oil mist. The essence of the method lies in determining the oil mist aerosol concentration ratio after passage through the filter to the concentration prior to filtering. Diagrams are presented of the test stand and the equipment for measuring the filtering properties. The units have been effectively used for testing a variety of filters and filter materials. Experimental data on tests of two commercial filters for airtightness, productivity and efficiency are cited in a table. (Two illustrations, one table, 10 biblio. references).

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USSR

UDC 576.851.49(Bact. typhi).098.083.1

BASNAK'YAN, I. A., and MEL'NIKOVA, V. A., Moscow Institute of Vaccines and  
Sera imeni Mechnikov

"A Study of the Content of Macromolecular Compounds During Continuous Culturing  
of Typhoid Bacilli. Report II. A Study of the DNA/Mass Ratio"

Moscow, Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii, No 11, 1971,  
pp 44-49

Abstract: The DNA-mass ratio was determined in typhoid bacilli grown under various conditions. The microbial population begins to divide only after the DNA/mass ratio exceeds the critical value of 1.68. This ratio assumes a minimum value during the interphase, increases prior to the beginning of the first division, and remains at a relatively steady level of about 3.5 throughout the exponential reproduction phase and the reduced reproduction phase. The DNA/mass ratio assumes these values during both continuous and periodic culturing, at higher and lower cell division rates, under various nutritional conditions, and in different types of synthetic media.

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USSR

UDC 576.851.49.083.3

BASNAK'YAN, I. A., and MEL'NIKOVA, V. A., Moscow Institute of Vaccines and Sera  
imeni Mechnikov

"A Study of the Content of Macromolecular Compounds in Continuously Cultured Typhoid Bacteria. Report IV. Effect of Bacterial Concentration on the DNA/Mass Ratio in the Presence of Balanced and Unbalanced Growth"

Moscow, Zhurnal Mikrobiologii, Epidemiologii, i Immunobiologii, No 3, 1973,  
pp 66-71

Abstract: The DNA/mass ratio of *S. typhi* vaccine strain Ty<sub>2</sub> 4446 cultured under various conditions was studied to determine if this ratio could serve as an index of optimum culturing conditions. Cultures grown in excess glucose (1.0-11.5 mg/ml) and limited glucose (0.04-0.32 mg/ml) were compared. Bacterial concentrations were varied in excess glucose by changing the medium's O<sub>2</sub> content and in limited glucose by changing the initial glucose concentration prior to dilution. Experiments showed that the DNA/mass ratio did not depend on bacterial concentration in limited glucose but was high at 0.2-1 billion cells/ml and low at smaller and greater concentrations in excess glucose. The higher DNA/mass ratio noted in exponential growth (balanced) in previous papers can be explained by these findings: Exponential growth occurs in excess  
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USSR

BASNAK'YAN, I. A. and MEL'NIKOVA, V. A., Zhurnal Mikrobiologii, Epidemiologii, i Immunobiologii, No 3, 1973, pp 66-71

glucose, and since under such conditions DNA/mass ratio varies with bacterial concentration, when the latter reaches 0.2 billion cells/ml the DNA/mass ratio begins to climb until glucose becomes limiting. This suggestion was confirmed experimentally. The range of bacterial concentrations at which the DNA/mass ratio is high in excess glucose also corresponds to high physiological activity and high concentrations of other macromolecular compounds, as shown in preview studies. Thus the DNA/mass ratio can be used as a sensitive index of optimum conditions in the culture medium.

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USSR

UDC 576.851.49.095.6.576.851.49.098.396.332

MEL'NIKOVA, V. A., and BASNAK'YAN, I. A., Moscow Institute of Vaccines and Sera  
imeni Mechnikov

"A Study of the Content of Macromolecular Compounds in Continuous Cultures of Typhoid Bacilli. Report I. The Relationship Between the Rate of Cell Division and the Intracellular Content of DNA, RNA, and Proteins"

Moscow, Zhurnal Mikrobiologii Epidemiologii i Immunobiologii, No 5, May 71, pp 62-66

Abstract: The *S. typhi* Ty<sub>2</sub> 4446 vaccine strain was used in this investigation of the cell division rate and the intracellular concentration of various compounds during continuous and periodic culturing. The fastest rate of cell division occurred in the exponential phase of proliferation, but was constant for any given medium. With increasing concentration of nutrients in the medium, the rate of division and the concentration of intracellular contents also increased. For example, at a cell division rate of 0.170 generations per hour, the concentrations of intracellular compounds, expressed in micrograms per 10<sup>8</sup> cells, were: RNA -- 1.176; proteins -- 10.71; acid-soluble compounds -- 0.0522; optical density -- 0.0402; and DNA -- 0.191. At a cell division rate of 0.710 generations per hour, the corresponding figures were: 3.300; 21.07; 0.352;

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MEL'NIKOVA, V. A., et al, Zhurnal Mikrobiologii Epidemiologii i Immunobiologii, No 5, May 71, pp 62-66

0.147; and 0.732 (last figure at division rate of 0.68). Although some authors report a decrease in the concentration of DNA in analogous investigations, the discrepancy is only apparent and due to different methods of calculating the results. In this study, all concentrations are expressed per unit number of cells, while the other authors use a unit volume of the biomass as the common denominator. All findings indicate that the size and weight of individual cells increase with an increasing rate of cell division.

2/2

1/2 025 UNCLASSIFIED PROCESSING DATE--11SEP70  
TITLE--CATALYTIC HYDROGENATION OF NITRILES ON A STATIONARY NICKEL ALUMINUM  
CATALYST -U-  
AUTHOR--ZELENAYA, SH.A., BASOV, A.S., PAVLOV, A.A., PETRYAKOVA, N.K.,  
GUSHCHIN, N.V.  
COUNTRY OF INFO--USSR *B*  
SOURCE--KHIM. PROM. (MOSCOW) 1970, 46(1), 11-12  
DATE PUBLISHED-----70  
  
SUBJECT AREAS--CHEMISTRY, MATERIALS  
  
TOPIC TAGS--CATALYTIC HYDROGENATION, NICKEL BASE ALLOY, ALUMINUM  
CONTAINING ALLOY, ORGANIC NITRILE COMPOUND, PRIMARY AMINE, FATTY ACID  
  
CONTROL MARKING--NO PESTRICTIONS  
  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--1985/1452 STEP NO--UR/0064/70/046/001/0011/0012  
  
CIRC ACCESSION NO--AP0101538  
UNCLASSIFIED



2/2 025 UNCLASSIFIED PROCESSING DATE--11SEP70  
CIRC ACCESSION NO--AP0101538  
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A CATALYST FOR THE HYDROGENATION  
OF NITRILES WAS PREPD. BY PARTIAL LEACHING OF AL FOR 1:1 NI AL ALLOY 9Y  
20PERCENT NAOH AT 100DEGREES. THE NITRILES OF C SUB17 TO C SUB20  
SYNTHETIC FATTY ACIDS WERE HYDROGENATED BY H IN THE PRESENCE OF NH SUB3  
AT 95 TO 120DEGREES-50 ATM, WITH FLOW RATE OF NITRILES 0.25 AND NH SUB3  
0.32 VOL.-HR, TO GIVE 100PERCENT CONVERSION TO AMINES. THE CONC. OF  
PRIMARY AMINES IN THE PRODUCT WAS 84.8PERCENT, THAT OF SECONDARY AND  
TERTIARY AMINES WAS 11.9PERCENT. AT GREATER THAN 10DEGREES, THERE WAS A  
SHARP DECREASE IN SELECTIVITY.

UNCLASSIFIED

BASOV, B. M.

PART V. ELECTRIC FIELDS

SPAS 55982

15 May 72

ELECTRIC DISCHARGES OF THREE SPECIES OF NONELECTRIC BLACK SEA FISH  
[Article by B. M. Basov, V. M. Krut'ko, N. A. Mikhaylov and V. E. Fyodorov,  
Sovetskoye More, Biologiya, Leningrad, No 5, 1971, 120-125 "Naukova Dumka",  
pp 113-116]

Until recently it was assumed that all fish can be classified as strongly electric, using their strong fields with a strength of hundreds of volts along the length of the fish for defense and attack, and weakly electric, using the pulsating fields with a strength of tens-hundreds of millivolts for spatial orientation, and also nonelectric species of fish. Biologists assigned the overwhelming majority of the species to the third group. Recently, as a result of studies by B. Basov (1958), who studied the mechanism of electrolocation in weakly electric fish (Electrona diascia), and V. Manko, who discovered a capacity of fish to emit waves of a new physical nature (called hydronic waves), interest in clarifying the electric properties of fish has increased considerably.

Investigations of nonelectric fish made by the authors during 1967-1968 revealed that many species of fish earlier considered nonelectric in actuality are capable of emitting weak electric discharges (Protusov, 1968).

We will examine the electric discharges of three species of school fish in the Black Sea: jackfish (Trachurus trachurus L.), the sturgeon (Acipenser husacus ponticus Fina) and anchovy (Engraulis ponticus Alek). In experiments conducted in aquaria at the Nauchno-Issledovatskiy Institut of Biology of Southern Seas in August 1968 we studied young sturgeon (120 fish) measuring 7-3 cm and adults (50 fish),

1 Donnet, 1967.

USSR

UDC 597.591.175

PROTASOV, V. R., BASOV, B. M., KRUMIN, V. M., ORLOV, A. A., and KUZNETSOV, V. A., Institute of Evolutionary Morphology and Ecology of Animals, USSR Academy of Sciences, Moscow

"Low-Frequency Electrical Discharges of Nonelectrical Fish"

Moscow, Zoologicheskii Zhurnal, Vol 50, No 5, May 71, pp 779-782

Abstract: Electrical discharges from a number of nonelectric fish in the frequency range of 0.2 to 12.0 cycles were recorded. The fish used differed in their movements, their structural make-up, excitability, and respiratory activity. The oscillograms obtained could be separated into two groups: the first one reflects the respiratory processes of the fish. In this case, potentials can be recorded when the fish are in a quiet state close to the electrodes. Values of 5-20 microvolts were recorded. The second group of oscillograms reflects the motor activity of the fish during excitation. The amplitude of these potentials is considerably higher and reaches 150 microvolts. Amplitude and frequency of the impulses are increased with increasing excitation of the fish. These impulses are caused not only by neuromuscular activity but also by the movement of the fish between the electrodes. The potentials are specific for each fish species. It was concluded that degree

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PROTASOV, V. R., et al., Zoologicheskiy Zhurnal, Vol. 50, No 5, May 71,  
pp 779-782

of excitation and fish mobility can be directly related to the oscillograms. The low-frequency impulses from some groups and schools of fish were recorded also. A summation effect of frequency as well as duration of the impulses was found. It was noted that there was some synchronization in the respiratory rhythm of the fish.

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USSR

UDC: 533.9...16

BASOV, N. G., ZARITSKIY, A. R., ZAKHAROV, S. D., KRYUKOV, P. G., MAT-VEYETS, Yu. A., SENATSKIY, Yu. V., FEDOSIMOV, A. I., CHEKALIN, S. V.

"Producing High-Power Light Pulses on Wavelengths of 1.06 and 0.53  $\mu\text{m}$  and Using Them to Heat a Plasma. II. A Neodymium Glass Laser With Conversion of Emission to the Second Harmonic"

Moscow, Kvant. elektronika--sbornik (Quantum Electronics--collection of works), "Sov. radio", 1972, pp 50-55 (from RZh-Fizika, No 6, Jun 73, abstract No 6G375)

Translation: Investigations of processes of heating by means of laser sources with different wavelengths are of considerable importance for explaining mechanisms of energy transfer in laser heating of a plasma. This paper tells of the development of a high-power light source for heating experiments with emission on two wavelengths: the wavelength of a neodymium laser (1.06  $\mu\text{m}$ ) and its second harmonic (0.53  $\mu\text{m}$ ). An efficiency of greater than 50% in converting 1.06- $\mu\text{m}$  emission to the second harmonic is achieved in a KDP crystal. The emission energy on the 0.53- $\mu\text{m}$  wavelength is 10 j with a pulse duration of 1.0 ns. Part I, see RZhFiz, 1973, 5G239.

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USSR

UDC 537.521

BASOV, N. G., Academician, BELENOV, E. M., VOL'NOV, M. I., GUBIN, M. A.,  
DANILEYKO, M. V., and NIKITIN, V. V., Physics Institute imeni P. N. Lebedev,  
Academy of Sciences USSR, Moscow

"On the Question of Generating a Stabilized, Ring-Resonator Laser  
Frequency"

Moscow, Doklady Akademii Nauk SSSR, Vol 210, No 2, 1973, pp 306-308

Abstract: The power resonances of a ring laser can be considerably narrower and more contrasting than in the case of a linear laser. They are based on more complex effects, and the coincidence of the center of the resonances with the central absorption frequency is not obvious. The article studies this question theoretically and experimentally. It is shown that, as in the case of a linear laser, the power resonances of a ring laser occur at the central frequency of the absorbing gas.

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USSR

UDC 535.374

BASOV, N. G., DANILYCHEV, V. A., MOLCHANOV, A. G., POPOV, YU. M., and  
KHODKEVICH, D. D., Physics Institute imeni P. N. Lebedev, Academy of Sciences  
USSR

"Lasers Using the Luminescence of Self-Trapped Excitons in Condensed Inert  
Gases"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, Vol 37, No 3, 1973,  
pp 494-497

Abstract: The article considers a scheme for the population of the working  
levels and conditions for the generation of vacuum UV radiation in condensed  
inert gases excited by a fast electron beam. Experimental data are given on  
the laser coherence and the efficiency of the conversion of the electron  
beam energy to radiative energy in liquid xenon.

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USSR

BASOV, N. G., ORAYEVSKIY, A. N., et al., Lebedev Physics Institute, USSR  
Academy of Sciences

"Nonequilibrium Oscillation Kinetics of Molecules in the Presence of a  
Resonant Laser Radiation Field"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Nov 73, pp 1837-1856

**Abstract:** The oscillation kinetics of molecules under nonequilibrium conditions produced by resonant laser radiation is considered within the framework of the harmonic oscillator model. A method is developed which can be employed for studying the response of the system to an external field whose frequency is identical to that of one of the vibration levels (arbitrary multiplicity resonance). The nonequilibrium distribution function is calculated for stationary and quasistationary conditions. The dependence of the vibrational energy and decay rate of the system on external parameters determined. The extreme characteristics are determined. Similar questions are studied for nonequilibrium conditions produced by resonant laser radiation via a cascade mechanism of population of the vibrational levels. The article includes 22 equations and six figures. There are 32 references.

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USSR

UDC: None

BASOV, N. G., BOYKO, V. A., ZAKHAROV, S. M., KROKHIN, O. N.,  
MIKHAYLOV, Yu. A., SKLIZKOV, G. V., and FEDOTOV, S. I.

"Mechanisms of Neutron Generation in a Laser Plasma"

Moscow, Pis'ma v ZhETF, vol 18, No 5, 5 September 1973, pp 314-317

Abstract: This letter gives the results of experiments performed to investigate the mechanisms which give rise to neutrons in laser plasmas. The experiments here described proved that, depending on the experimental conditions, both hot and cold neutrons are produced. The measurements involved were conducted in a variant of the sharp focusing of a single-channel laser on a massive CD<sub>2</sub> target, as well as in spherically symmetrical irradiation of CD<sub>2</sub> particles measuring about 100  $\mu$  in diameter by the output of a multichannel laser. Both methods were discussed in earlier papers by the first-named author above, et al (Pis'ma v ZhETF, 13, 1971, p 691; 15, 1972, p 589; ZhETF, 62, 1972, p 203). Results of both types of measurement are separately examined. Some of these cast doubt on the assertion of previous researchers that the appearance of fast ions is connected with acceleration in the critical density region.

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USSR

BASOV, N. G., DANILYCHEV, V. A., KERIMOV, O. M., PODSOSONNY, A. S.,  
Physics Institute imeni P. N. Lebedev, Academy of Sciences of the USSR

"Population Inversion in the Active Medium of an Electroionization CO<sub>2</sub>  
Laser for a Pressure of the Working Mixture of Up to 20 Atmospheres"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol  
17, No 3, 5 Feb 73, pp 147-150

Abstract: The authors study the variation, with time, of the inverse  
population in the active medium of an electroionization CO<sub>2</sub> laser. It  
is experimentally shown that increasing the pressure of the working mixture  
up to 20 atmospheres does not lead to any qualitative changes in the  
processes of excitation and relaxation of laser levels. The authors thank  
N. A. Penin and V. A. Kurbatov for furnishing a receiver with a resolution  
of  $3 \cdot 10^{-9}$  sec.

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USSR

UDC 621.378.325 + 545.46

BASOV, N.G., ZARITSKIY, A.R., ZAKHAROV, S.D., KRYUKOV, P.G., MATVEYETS, YU.A.,  
SENATSKIY, YU.V., FEDOSIKOV, A.I., CHEKALIN, S.V.

"Achievement Of Powerful Light Pulses At A Wavelength Of 1.05 And 0.53 Micron  
And Their Use For Plasma Heating. II--Nd-Glass Laser With Conversion Of Radi-  
ation To The Second Harmonic"

Kvantovaya elektronika (Quantum Electronics), Moscow, No 6(13), 1972, pp 90-92

Abstract: The construction is described and the characteristics presented of a  
multistage Nd-glass laser. The laser assembly consists of the following: 1)  
Active elements of GLS-1 neodymium glass, 700 mm long with ends cut at a  
Brewsterian angle; 2) Resonator mirror; 3) Cells with clearing absorber; 4)  
Aperture diaphragms; 5) Selectors of longitudinal types of oscillations in  
oscillator; 7) Lenses; and 8) Electrooptical gate with a laser discharger.  
A driving oscillator assembled according to the scheme of an oscillator with  
self-synchronization of modes serves as the source of short light pulses in the  
device. The length of the oscillator resonator, formed by two mirrors with re-  
flection coefficients of 100 and 20 percent, amounts to 6 m. Cells with a non-  
linear absorber -- a solution of No. 3955 dye in nitrobenzene -- were in con-  
tact with an opaque mirror. Two selectors of axial modes in the form of  
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USSR

BASOV, N.G., et al, Kvantovaya elektronika, Moscow, No 6(12), pp 50-55

inclined Fabry-Perot interferometers were used for narrowing of the generation spectrum. With the aid of these interferometers the generation spectrum was narrowed to  $\sim 0.05 \text{ \AA}$  and in so doing the pulses emitted by the oscillator were expanded to 1 nanosec. In the KDP crystal the radiation at the output is converted into a second harmonic with an efficiency greater than 50 percent. The radiation energy at a 0.53 micron wavelength amounts to 10 joule. The authors thank M.F. Stelmakh, I.S. Rezn, A.I. Kovrigin, and V.P. Polov for assistance in conducting experiments with KDP crystals. 3 ill. 16 ref. Received by editors, 25 Oct 1971.

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USSR

UDC 543.46 + 621.373.525

BASOV, N.G., ZARITSKIY, A.R., ZAKHAROV, S.D., KROKHIN, O.N., KRYUKOV, P.G.,  
MATVEYETS, YU.A., SENATSKIY, YU.V., FEDOSIMOV, A.I.

"Achievement Of Powerful Light Pulses At 1.06 And 0.53 Micron Wavelengths And  
Their Use For Plasma Heating. I. Experimental Study Of The Processes Of Radia-  
tion Reflection During Laser Heating Of Plasma At Two Wavelengths"

Kvantovaya elektronika (Quantum Electronics), Moscow, No 5(11), 1972, pp 63-71

Abstract: The experimental results are presented of calorimetric, temporal,  
spectral and polarization measurements of radiation reflected back from plasma  
which is heated by nanosecond laser pulses with a wavelength of 1.06 and 0.53  
micron with fluxes at targets of various materials exceeding  $10^{14}$  watt/cm<sup>2</sup>.  
The results discussed represent the first attempt to study laser heating of  
plasma which is produced at solid targets in the green region of the spectrum.  
It is found that plasma absorption of the heating light at a 0.53 micron wave-  
length is three times greater than at a 1.06 micron wavelength. The authors  
express their appreciation to V.B. Rozanov for discussion of the results of the  
work. 3 fig. 19 ref. Received by editors, 25 Oct 1971.

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USSR

BASOV, N. G., BASHKIN, A. S., IGOSHIN, V. I., ORAYEVSKIY, A. N., and YURYSHEV, N. N.

"Study of Vibrational Energy Transfer From OD to CO<sub>2</sub>"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 16, No 10, 20 Nov 72, pp 551-555

Abstract: The article reports the first detection of effective energy transport from the OD radical to CO<sub>2</sub> molecules, resulting in the laser effect in a mixture of O<sub>3</sub>, D<sub>2</sub>, and CO<sub>2</sub> at a wavelength of 10.6 microns. A simple analytic reaction model and the results of measuring the time characteristics of the laser generation pulse are used to evaluate the rate constant for vibrational-vibrational energy exchange between OD and CO<sub>2</sub>. The authors used two measurement methods -- according to the time delay of generation relative to the onset of initiation, and according to attenuation of the chemical laser generation signal. A laser tube 80 cm long and 1.5 cm in diameter was used in the experiment. Pumping was effected by two IFP-20000 lamps.

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USSR

UDC 537.521

ALEKSEYEV, V. A.; BASOV, N. G., Academician; BELENOV, E. M.;  
DANILEYKO, M. V.; VOL'NOV, M. I.; GUBIN, M. A.; NIKITIN, V. V.;  
TROSHAGIN, V. N.; P. N. Lebedev Physics Institute, Moscow

"Spectroscopy Inside a Uniform (Radiation) Line"

Moscow, Doklady Akademii Nauk SSSR, vol 207, No 6, 1972, pp 1306-1307

Abstract: A method is proposed and realized for finding the shift,  $2\Delta$ , between the spectral components of a line in the radiation of atoms or molecules, and in such cases when the  $2\Delta$  value is much less than the uniform or radiation width. The method is based on the concurrence of spatial and frequency attenuation effects of the medium in a ring laser. The dependence of the qualitatively different oscillation modes of the laser on the frequency difference  $\Delta$  permits recording the presence of the Doppler broadening of the line for  $\Delta$  by an amount much less than for the uniform width. It is found that, from the viewpoint of the accepted criterion of spectral line resolution, the sensitivity of the proposed method can be multiplied by  $10^2$ - $10^4$  times. The theory of the method is developed, and an experiment for resolving the fine  
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USSR

ALEKSEYEV, V. A., et al, Doklady Akademii Nauk SSSR, vol 207, No 6, 1972, pp 1306-1307

structure of the line, conducted with a laser containing a mixture of  $\text{Ne}^{20}$  and  $\text{Ne}^{22}$ , is described.

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USSR

BASOV, N. G.; et al (Lebedev Physics Institute, USSR Academy of Sciences)

"Electro-Ionization Lasers"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki; January, 1973;  
pp 108-21

Abstract: The article concerns an electro-ionization method for excitation of gas lasers. The conductivity of a dense gas medium is produced by ionizing radiation from an external source, whereby the energy of an electric current passing through the gas can be transformed into molecular excitation energy. The mechanism of introducing energy into an electro-ionization gas laser medium and exciting the laser levels is discussed. The authors present the experimental results of an investigation of an electro-ionization CO<sub>2</sub> laser operating with a CO<sub>2</sub>: N<sub>2</sub>: He mixture at pressures of up to 50 atmospheres. A specific oscillation power of about  $10^6$  w/cm<sup>3</sup> is attained for a pulse duration of  $\sim 10^{-7}$  seconds. Current, threshold, and energy characteristics; variation of the amplification factor with pressure and composition of the mixture; and

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USSR

BASOV, N. G.; et al., Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki;  
January, 1973; pp 108-21

also the spectrum of the radiation from the electro-ionization CO<sub>2</sub> laser are presented. The possibility of gradual frequency tuning and the generation of intense ultrashort pulses is discussed.

The article includes 19 equations and 11 figures. There are 22 bibliographic references.

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USSR

UDC 631.486.243:621.375.8

B  
BASOV, N. G., BOGDANKEVICH, O. V., NASIBOV, A. S.

"Cathode Ray Tube"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obratzys, Tovarnyye Znaki, No 16,  
8 May 70, p 57, Patent No 270100, Filed 20 Feb 67

Translation: 1. This Author's Certificate introduces a cathode ray tube which is in the form of an evacuated bulb containing an electron gun with an electron beam control system and a converter for converting the electron beam energy to light energy. The tube is distinguished by the fact that to increase directivity and brightness of glow of the image, the converter is executed in the form of a monocrystalline film with smooth surfaces. The film made of semiconductor material is excited by the electron beam and constitutes an active laser element.

2. A second cathode ray tube like in item 1 is introduced. It is distinguished by the fact that to improve the directivity of glow of the image, the semiconductor film is attached to an optically transparent plane-parallel plate which, together with the film, forms an optical resonator.

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USSR

BASOV, N. G., ORAYEVSKIY, A. N., SUCHKOV, A. F., Physics Institute imeni P. N. Lebedev, Academy of Sciences of the USSR

"Feasibility of Ultrashort Laser Pulse Emission on Combination, Vibrational-Rotational Transitions of Molecular Hydrogen"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 16, No 5, 5 Sep 72, pp 301-304

Abstract: The authors consider the possibility that laser emission might be achieved on transitions which show up in the vibrational-rotational spectrum of hydrogen in the presence of a sufficiently strong electric field  $E$ , either AC or DC. The probability of emission or absorption of a quantum is proportional to  $E^2$ . An expression is derived for finding the amplification factor on induced transitions. The results of the study show that it is possible, at least in theory, to achieve emission without an external field which induces transitions.

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BASOV, N. G.

000-327-3743 72  
8 Jun 73

ACADEMY OF SCIENCES OF THE USSR  
P. N. PUPKOV PHYSICAL INSTITUTE

Preprint 8 82

DIRECT THEORETICAL AND NUMERICAL INVESTIGATION OF A  
EISENBERG-ROSSI-MAGNUS LAMAR-BROOKS

N. G. Basov, N. M. Fokalev, P. G. Kopylov, Yu. A. Karyota,  
A. A. Kopylov, S. D. Panchenko, N. V. Chirilin, N. V. Chirila

Presented at the Conference on Nonlinear  
Optics, Kiev, 27 June - 1 July, 1972

7-11536  
Submitted to JOURNAL OF THE USSR PHYSICAL  
OPTICS, Vol. 1, No. 1, 1973.  
Submitted to JOURNAL OF THE USSR PHYSICAL  
OPTICS, Vol. 1, No. 1, 1973.

1973, 4, 1972

APPROVED

22

# DISPERSED RADIATION CHARACTERISTICS OF A COHERENT LASER LIGHT RADIATION

N.G. Bessonov <sup>1)</sup>, N.N. Gerasimov <sup>2)</sup>, P.G. Kravtsov <sup>3)</sup>,  
Yu.I. Litvinov <sup>1)</sup>, N.N. Litvinov <sup>2)</sup>, S.N. Litvinov <sup>2)</sup>,  
A.V. Chichikov <sup>1)</sup>, A.V. Chichikov <sup>2)</sup>

## INTRODUCTION

Presently the mode-locked Nd-glass lasers are the subject of extensive research efforts aimed at the determination of their radiation shape and duration. In the expected single pulses duration is  $\sim 10^{-10}$  sec, all the conventional diagnostic techniques (pico-second oscilloscopes with channel photodiodes, ordinary image converter streak cameras) fail to provide detailed information on the radiation pulse shape.

There are also indirect methods (for 1-3) for evaluating the duration of the laser ultra-short pulses (USP). Unfortunately, these methods based upon the measurement of second and higher-order correlation functions are unable to give unambiguous results unless some assumptions are made concerning

<sup>1)</sup> P.N. Lebedev Physical Institute of the Academy of Sciences of the USSR

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<sup>3)</sup> V.V. Kuznetsov Institute of Atomic Energy

UDC: None

USSR

BASOV, N. G., MAL'TSEV, K. K., MARKIN, Ye. P., MARTYSENKO, V. D.,  
ORAYEVSKIY, A. N., PANKRATOV, A. V., SAGITOV, R. G., and SKACHKOV,  
A. N.

"Chemical Laser of Mixed Difluoramin With Hydrogen"

Moscow, Sbornik kratkiye soobshcheniya po fizike, No 11, November  
1971, pp 3-9

Abstract: This brief communication reports oscillations obtained from oscillatory-rotatory transitions of HF molecules resulting from the reaction of  $\text{NF}_2\text{H}$  with hydrogen, specifically the time variations of the gain yielded by the mixture as a function of the experimental conditions. The experimental equipment consisted of two lasers, an oscillator, and an amplifier, excited by an electrical discharge through the mixture. The oscillator was a quartz tube 85 cm long and 1.7 cm in diameter, with LiF windows set at the Brewster angle. Determinations were made of the optimal relationships between the pressures of the  $\text{NF}_2\text{H}$  and  $\text{H}_2$  in the mixture, and a curve is plotted of the energy of the pulse oscillation in the mixture as a function of the ratio of the two pressures. Curves are also plotted for the gain factor in the mixture as a function of time. The authors express their thanks to L. V. Kulakov for his help in plotting the pulse energy spectrum.

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• USSR

BASOV, N. G., IVANOV, YU. S., KROKHIN, O. N., MIKHAYLOV, YU. A., SKLIZKOV, G. V., and FEDOTOV, S. I., Physics Institute imeni P. N. Lebedev, Academy of Sciences USSR

"Neutron Production in Spherical, High-Power Laser Irradiation of a Target"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15, No 10, 20 May 72, pp 589-592

Abstract: The authors recorded the neutron yield during the heating of a solid, deuterated polyethylene target subjected to spherical irradiation by a multibeam laser. It was found that the results significantly exceed those obtained during strong focusing. The size of the heated target was approximately equal to the focal spot diameter, and the heated mass was determined by the particle mass. The scheme for focusing nine laser beams on the target was similar to one previously described by the authors. The neutrons were recorded by three scintillation detectors placed at various distances from the target. Recoil-proton nuclear photoemulsions were used for the quantitative measurements. Assuming isotropism of the neutron escape from the plasma, the number of neutrons per burst was found to be equal to  $3 \cdot 10^6$ .

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USSR

BASOV, N. G., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15, No 10, 20 May 72, pp 589-592

The authors thank V. G. LARIONOVA and L. I. IVANOVA for assistance in processing the photoemulsions, and V. M. GROZNOV, A. A. YEROKHIN, N. N. ZOREV, and N. V. NOVIKOV for assisting in the work.

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USSR

BASOV, N. G., ZAVOROTNYY, S. I., MARKIN, YE. P., NIKITIN, A. I., and  
ORAYEVSKIY, A. N., Physics Institute imeni P. N. Lebedev, Academy of Sciences  
USSR

"High-Pressure Pulsed Chemical Laser Using a  $D_2+F_2+CO_2$  Mixture"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15,  
No 3, 5 Feb 72, pp 135-137

Abstract: The idea of obtaining an inverted population by energy transfer from "hot" molecules obtained during a chemical reaction to "cold" molecules was first suggested by the authors with application to chemical lasers. The method of introducing a polyatomic  $CO_2$  molecule into a  $D_2+F_2$  mixture enabled the authors to increase the chemical efficiency and output energy of a pulsed chemical laser approximately 10-fold, and the successful completion of experiments with the mixture at low pressures made it possible for them to undertake experiments at higher reactant pressures. The introduction of  $CO_2$  molecules made it possible to put together a working mixture in which the partial pressures of deuterium and commercially pure fluorine exceeded the

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USSR

BASOV, N. G., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15, No 3, 5 Feb 72, pp 135-137

second chain flammability limit of a pure stoichiometric  $D_2 + F_2$  mixture. The typical partial pressure ratio of the principal components of the gas mixture -- fluorine, deuterium, carbon dioxide, and helium -- was 1:1 4:11 [sic] respectively, and the total pressure varied within several hundred torr. Experiments were staged in a stainless steel reactor vessel. Initiation of the reaction was effected by the radiation of a linear flash lamp with a brightness temperature of 20,000-25,000° K. It was found that the rate of formation of fluorine atoms during dissociation of fluorine molecules under the action of the radiation of the source being used is insufficient in most cases for the development of oscillation. Therefore, to improve reaction initiation conditions, a readily dissociating fluorine-containing component (molybdenum hexafluoride or other fluorine compound) was added to the mixture. The  $MoF_6$  pressure (several torr) was chosen so that the characteristic chemical reaction time should be about 1-2 microseconds. On a wavelength of about 10.6 microns oscillation as a rule, appears 5 microseconds after the start of the light pulse and lasts 7-10 microseconds. Spikes lasting about 1 microsecond

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USSR

BASOV, N. G., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15, No 3, 5 Feb 72, pp 135-137

are sometimes observed at the top of the pulse. The energy in the radiation pulse varies from 5 to 15 j according to the composition of the gas mixture.

The authors thank A. V. PANKRATOV, V. S. ZUYEV, V. L. TAL'ROZA, P. G. GRIGOR'YEV, L. V. KULAKOV, V. T. GALOCHKIN, V. V. GROMOV, B. L. BOROVICH, and G. K. VASIL'YEV for their assistance in the work.

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USSR

BASOV, N. G., BEREZIN, P. D., BLINOV, L. M., KOMPANETS, I. N., MOROZOV, V. N.,  
and NIKITIN, V. V., Physics Institute imeni P. N. Lebedev, Academy of Sciences  
USSR

"Phase Modulation of Coherent Light by Means of Liquid Crystals"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15,  
No 4, 20 Feb 72, pp 200-203

Abstract: The article describes results of a study of the effect of phase modulation with an electric field of coherent light passing through a nematic liquid crystal with positive anisotropy of permittivity ( $\epsilon_{\parallel} > \epsilon_{\perp}$ ). Such modulation opens up the possibility of the use of thin transparent layers of liquid crystals in controlled phase transparencies and permits an increase in optical data processing speed as compared to the speed of other liquid-crystal light switches. Phase changes in the light passing through the liquid crystal were recorded by observing the interference of light reflected by a rear and a front electrode. 4'-ethoxybenzylidene-4-aminobenzonitrile was used as the liquid crystal.

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Lasers and Masers

USSR

UDC 621.378.33

BASOV, N. G., BELENOV, E. M., DANILYCHEV, V. A., and SUCHKOV, A. F.

"Pulsed CO<sub>2</sub>-Laser With High Pressure of the Gas Mixture"

Moscow, Kvantovaya Elektronika, No 3, 1971, pp 121-122

Abstract: Short powerful pulses of coherent light are required for solving any number of physical problems. However, solid-state lasers are ordinarily used as the sources of powerful pulses. Theoretically, such pulses can be produced from gas lasers as well if the concentration of active particles in the gas is close to their concentration in solid-state lasers. It is certainly interesting to design gas lasers that operate with a high working gas pressure. Typical powerful CO<sub>2</sub>-lasers operate at pressures of about 50 torr, and recently such lasers have been designed for operation at working mixture pressures up to 1 atm. However, the method of exciting gas lasers can not ensure uniformity in the active medium and is only slightly effective in the region of higher pressures. However, by raising the pressure to 1 atm, the authors were able to observe the spontaneous synchronization of the modes and to produce powerful ultrashort light pulses. The difficulties involved in exciting a gas-discharge laser were overcome by using an external source for ionizing the gas. The electric discharge was activated in a mixture of CO<sub>2</sub>+N<sub>2</sub>+H<sub>2</sub>O+He

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BASOV, N. G., et al., Kvantovaya Elektronika, No 3, 1971, pp 121-122

placed between two flat electrodes. By further increasing the gas pressure, one can reduce the duration of the generation pulse and simultaneously increase the energy. Thus, with large pressures the self-synchronization of the modes may ensure the generation of ultrashort radiation pulses with a duration of about  $10^{-11}$  seconds. The article contains 1 figure and 5 bibliographic entries.

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USSR

BASOV, N. G., BELENOV, E. M., DANILYCHEV, V. A., KERIMOV, O. M., KOVSH, I. B.,  
and SUCHKOV, A. F., Physics Institute imeni P. N. Lebedev, Academy of Sciences  
USSR

"Gas Lasers at High Pressures"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 14,  
No 7, 5 Oct 71, pp 421-426

Abstract: A gas laser, operating at pressures of tens of atmospheres and high-power, short-duration pulses is described. Its active part is excited by electrons from an ionizing radiation source, accelerated further by an electric field. Essential problems to be solved are: 1) mechanism of the introduction of energy, and 2) conditions of stability of operation not perturbed by quenching processes.

1) Power in the active part of the laser may be divided into two components: one due to the electron current, and another - to both ions and electrons. It was found that in normal operation, the former is several orders of magnitude larger than the latter. A set of partial differential equations is given, the solution of which establishes conditions for the avalanche gas ionization. It was also found that in normal operation the

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USSR

BASOV, N. G., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 14, No 7, 5 Oct 71, pp 421-426

potential gradient along the discharge sector, including the cathode drop, was constant. Typical parameters of laser operation are given: with a pulse length of  $2 \times 10^{-8}$  sec, electron particle density  $10^{15} \text{ cm}^{-3}$ , the discharge specific energy is 3 to 4 joule  $\text{cm}^{-3}$ .

2) With the potential being larger than its breakdown value, volume discharge is stable during the spark generation period. Cases were examined for the potential difference being below that value. As with an increase of current, the temperature increases, leading to a decrease of pressure, and the breakdown conditions are reached. The dynamics of this type of perturbation is described by three partial differential equations, and computation of the energy needed to produce a discharge with the initial potential difference half the critical value is performed as an illustration. This type of relationship is used as a criterion of stability. Graphs are presented giving threshold voltage as a function of pressure for mixtures of  $\text{CO}_2:\text{N}_2$  and of  $\text{CO}_2:\text{N}_2:\text{He}$ .

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USSR

BASOV, N. G., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 14, No 7, 5 Oct 71, pp 421-426

3) An experiment was performed with a molecular laser using  $\text{CO}_2$  at 25 atmospheres, with electron bunches as triggers. It was found that quenching collisions produced little effect upon the population inversion in  $\text{CO}_2$  at high pressure. It was found, however, that with an increase of pressure, the breakdown voltage increased across the discharge sector, and the specific energy input increased too. Increased collision frequency, accompanying the increase of pressure, reduces the generation pulse length.

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USSR

UDC 621.373:530.145.6

BASOV, N. G., IGOSHIN, V. I., MARKIN, Ye. P., ORAYEVSKIY, A. N.

"Dynamics of Chemical Lasers. (A Survey)"

V sb. Kvant. elektronika (Quantum Electronics--collection of works),  
No 2, Moscow, 1971, pp 3-24 (from RZh-Radiotekhnika, No 7, Jul 71,  
Abstract No 7D132)

Translation: The paper is a survey of chemical methods of laser excitation. An analysis is made of the possibility of obtaining an inverse population of the vibration levels of molecules in the case of self-sustained chemical processes (chain and branched-chain reactions, heat explosion). Special attention is given to problems of the theory of vibrational relaxation as applied to chemical lasers. The results of an experimental study of a number of lasers with chemical pumping are presented. Some methods of initiating reaction in large volumes of the reagent are qualitatively discussed. Chemical lasers are listed (as of 1 August 1970) with an index of working characteristics. Six illustrations, three tables, bibliography of ninety-nine titles. Resumé.

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USSR

UDC 621.378.33

BASOV, N. G., IGOSHIN, V. I., MARKIN, Ye. P., ORAYEVSKIY, A. N.

"Dynamics of Chemical Lasers"

Moscow, Kvantovaya Elektronika, No 2, 1971, pp 3-24

Abstract: The article is a survey of chemical methods of laser excitation. An analysis is made of the possibility of inverting populations of the vibrational levels of molecules in the case of self-sustaining chemical processes (chain and branched-chain reactions, thermal explosion). Special consideration is given to problems in the theory of vibrational relaxation as applied to chemical lasers. The results of experimental studies of a number of laser systems with chemical pumping are presented. Some methods of initiating a reaction in large volumes of reactant are discussed on the qualitative level. A list of chemical lasers is presented (as of 1 Aug 70) with indication of their operating characteristics. Six illustrations, three tables, and a bibliography of 99 titles.

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USSR

BASOV, N. G., DANILYCHEV, V. A., POPOV, Yu. M., and KHODKEVICH, D. D.,  
Physics Institute imeni P. N. Lebedev, Academy of Sciences USSR

"Laser in the Vacuum Region of the Spectrum from the Excitation of Liquid Xenon by an Electron Beam"

Moscow, Pis'ma Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 12,  
No 10, 20 Nov 70, pp 473-474

Abstract: Experiments to obtain generation in liquid xenon in the vacuum region of the spectrum under excitation by a powerful beam of fast electrons (electron current density up to  $200 \text{ amp} \cdot \text{cm}^{-2}$ ) are described. The use of condensed inert elements (Xe, Kr, Ar, Ne, He) to generate in the region of the vacuum ultraviolet was proposed and discussed earlier by the authors, and the development of a laser of condensed inert gases was facilitated by the possibility of achieving a four-level scheme. In previous experiments on the excitation of condensed inert gases and their mixtures by fast electrons the luminescence spectra were observed, the effectiveness of luminescence was evaluated, and weak induced radiation of liquid xenon at the wavelength  $\sim 1760 \text{ \AA}$  was observed. These experiments were made without mirrors and at a low excitation density (maximum electron current density  $1/2$

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BASOV, N. G., et al, Pis'ma Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 12, No 10, 20 Nov 70, pp 473-474

(maximum electron current density was  $25 \text{ amp}\cdot\text{cm}^{-2}$ ). In this study the radiation spectrum of liquid xenon was measured for two values of the pumping current density:  $150 \text{ amp}\cdot\text{cm}^{-2}$  and  $70 \text{ amp}\cdot\text{cm}^{-2}$ . At electron current densities of more than  $100 \text{ amp}\cdot\text{cm}^{-2}$  the intensity of the  $1760 \text{ \AA}$  line strongly increases and the half-width of the line reaches  $20 \text{ \AA}$ , which is close to the resolution of the spectrometer, while the half-width of this line at low excitation density was  $80 \text{ \AA}$ . Semitransparent aluminum mirrors deposited on a substrate of lithium fluoride and coated with a protective layer of magnesium fluoride were used as mirrors. It is noted that the application of other inert gases in the condensed state should permit induced radiation over a wide range of wavelengths up to  $800 \text{ \AA}$ .

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Acc. Nr: **AP0043665**

Ref. Code: UR 0056

PRIMARY SOURCE: Zhurnal Eksperimental'noy i Teoreticheskoy  
Fiziki, 1970, Vol 58, Nr 2, pp 441-455

INVESTIGATION OF THE EMISSION SPECTRUM  
OF A He—Xe LASER WITH NONRESONANT FEEDBACK

Ambartsumyan, R. V.; Bazhulin, S. P.;

Basov, N. G.; Letokhov, V. S.

The emission spectrum of a continuously-operating He—Xe laser ( $\lambda = 3.51$  microns) is experimentally investigated from the viewpoint of obtaining nonresonant feedback operating conditions. Two types of cavities are investigated: 1) a system consisting of a scatterer and mirror and 2) a system of two spherical mirrors with a scatterer between them. Operation conditions with nonresonant feedback are obtained in a laser with a quasicentric cavity and a scatterer. The generation frequency in this case could be maintained in the vicinity of the maximum of the amplification line with an accuracy to  $\pm 1$  Mc/s. irrespective of variation of the geometrical size of the laser. In conclusion the possibility of feedback due to resonance scattering on the amplifying particles themselves is considered.

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UDC: 721.373:530.145.6

BASOV, N. G., DANILYCHEV, V. A., POPOV, Yu. M.

"Forced Emission in the Vacuum Ultraviolet Region"

V sb. Kvant. elektronika (Quantum Electronics--collection of works), No 1, Moscow, 1971, pp 29-34 (from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6D132)

Translation: The paper discusses the possibility of achieving emission in the vacuum region of the spectrum with excitation of condensed noble gases by an electron beam. Emission is experimentally produced in liquid xenon on a wavelength of 1760 Å. Excitation was by a beam of electrons with an energy of 800 keV. The threshold current density is determined (30-50 A/cm<sup>2</sup>) and measurements are made of the directivity of the emission (~70°) and the half-width of the emission spectrum (~20 Å). Three illustrations, bibliography of seventeen titles. Résumé.

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USSR

BASOV, N. G., BOYKO, V. A., GRIBKOV, V. A., ZAKHAROV, S. M., KROKHIN, O. N.,  
and SKLIZKOV, G. V., Physics Institute imeni P. N. Lebedev, Academy of  
Sciences USSR

"Gas Dynamics of a Laser Plasma in the Process of Heating"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 61, No 1(7),  
Jul 71, pp 154-161

Abstract: One of the two well-known approaches to the problem of heating plasma to thermonuclear temperatures by irradiating it with a laser is the method in which a substantial portion of the energy of the laser is converted into the energy of directed, gas-dynamic movement. In the present article, an attempt is made for the first time to measure the distribution of the density and speed of movement of the plasma, to evaluate the pressure of the plasma during the process of heating. A multimode, Q-switched laser and a carbon target were used, and measurements were made by slit scanning of an interferogram on an image converter. It was found that the maximum pressure ( $10^6$  atmospheres) and temperature occur at the beginning of the laser pulse. At later times, the profile of the density is elevated, and the area of the  $1/2$

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USSR

BASOV, N. G., et al., Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 61, No 1 (7), Jul 71, pp 154-161

plasma in which absorption takes place draws back from the target and increases. The mass of the gas heated directly by the laser beam also increases. The temperature in the hot portion drops, and an increasingly greater part of the radiation energy is converted directly into the kinetic energy of the disintegrating substance. In this manner, by varying the dependence of the dispersion of the radiation on time, it is possible to shift the maximum pressure and to achieve optimal utilization of the laser's energy when heating plasma under real conditions.

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Magnetohydrodynamics

USSR

UDC 621.378.9:533.9.02

BASOV, N. G., ZAKHAROV, S. D., KROKHIN, O. N., KRYUKOV, P. G., SENATSKIY, Yu. V.,  
RYURIN, Ye. L., FLDOSIMOV, A. I., CHEKALIN, S. V., SHCHELEV, M. Ya.

"Studies of a Plasma Formed by Ultrashort Laser Pulses"

Moscow, Kvantovaya Elektronika, No. 1, 1971, pp 4-28

Abstract: Experimental studies of processes occurring in the high-temperature heating of a plasma by focusing ultrashort laser radiation on the surface of lithium deuteride are described. Studies of plasma heating with laser radiation of duration  $10^{-11}$ - $10^{-12}$  sec were begun in 1968 at the Laboratory of Quantum Radiophysics of the Physics Institute imeni P. N. Lebedev. Fast neutrons were recorded upon focusing these pulses on the surface of a lithium deuteride target, indicating the rise of conditions for a thermonuclear reaction and for obtaining a plasma of high temperature and density. Subsequent research raised the following questions: how does absorption of energy by a solid occur if the laser radiation is concentrated in a pulse with a duration of several picoseconds? How is the strong reflection of laser radiation from the target explained? What are the possibilities of raising ion temperature, and consequently neutron yield, in

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USSR

BASOV, N. G., et al, Kvantovaya Elektronika, No. 1, 1971, pp 4-28

heating a plasma with ultrashort pulses? Shadow photographs of the plasma with illumination by ultrashort pulses and the recording of plasma dispersion with the aid of an electron-optical converter are described. The same electron-optical converter was used to study the change in the reflection of laser pulses with time, and x-ray measurements were made of the electron temperature of the plasma. A review of the basic experimental data indicates that the results are from laser pulses consisting not of one, but of several subpulses. Experiments show that the interaction of each subpulse with the target is not the same but a function of the previous history and repetition time of the subpulse relative to the beginning of the process. Heating of the plasma occurs as follows: one of the first subpulses incident on the target ionizes it to a depth approximately equal to the wavelength of the laser radiation. When the value of  $n_e$  becomes comparable to the value of  $n_{cr}$ , the remaining part of the subpulse is reflected. Heating of the plasma to a temperature of several electron-volts occurs simultaneously with ionization. As a result, the plasma formed is slowly dispersed. All subpulses incident on the target at this stage will be reflected until the particle density drops, as a result of dispersion, to a value corresponding to  $n_{cr}$ . At this time high-temperature heating of the plasma is possible. It is thus established that reflection of ultrasonic pulses arises in plasma regions where the electron density is close to critical. Other subjects discussed in the article include plasma radiation and heat conductivity, the effect of laser radiation pressure, and electron-ion relaxation in a plasma formed by a powerful ultrashort laser pulse.

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USSR

UDC 621.375.82

BASOV, N. G., DANILYCHEV, V. A., POPOV, Yu. M.

"Induced Radiation in the Region of the Vacuum Ultraviolet"

V sb. Kvant. elektronika (Quantum Electronics -- Collection of Works), No. 1, Moscow, 1971, pp 29-34 (from RZh-Fizika, No 7, Jul 71, Abstract No 7D1061)

Translation: The possibility of obtaining generation in the vacuum region of the spectrum under excitation of condensed noble gases by an electron beam is discussed. Generation was obtained experimentally in liquid xenon at a wavelength of 1760 Å under excitation by an electron beam with an energy of 800 kev. The threshold density of the current was determined (30-50 a/cm<sup>2</sup>), and the directionality of the radiation (≈7°) and the half-width of the generation spectrum (≈20 Å) were measured. 17 ref. Authors abstract.

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USSR

UDC 621.378.33

BAISOV, N. G., BELENOV, E. M., DANILEYKO, M. V., NIKITIN, V. V.

"Power Resonances and Frequency Stabilization of a Gas Laser With a Nonlinearly Absorbing Cell"

Moscow, Kvantovaya Elektronika, No. 1, 1971, pp 42-52

Abstract: Power resonances of a gas laser with a nonlinearly absorbing cell that are caused both by spectral effects (in a laser with a Fabry-Perot resonator) and by competition of spectral and spatial effects (in a laser with a ring resonator) are studied. The half-width of the power resonances of a laser with a Fabry-Perot resonator and a methane absorbing cell was of the order of 300 kHz. The half-width of resonances of a ring laser was ~30 kHz. The laser with a Fabry-Perot resonator and a methane cell stabilized at peak radiation displayed stability and a frequency generation equal to  $10^{-11}$ . It is concluded that the use of power resonances of a ring laser as optical discriminators can raise the stability and generation of the radiation frequency by more than an order of 2.

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USSR

BASOV, N. G., GROMOV, V. V., KOSHELEV, Ye. L., MARKIN, Ye. P., ORAYEVSKIY, A. N.,  
~~SHAPOVALOVA, D. S.~~, SHCHEGLOV, V. A., Physics Institute imeni P. N. Lebedev,  
Academy of Sciences, USSR

"A Continuous-Action DF — CO<sub>2</sub> Chemical Laser"

Moscow, Pis'ma v (Letters to the ) Zhurnal Eksperimental'noy i Teoreticheskoy  
Fiziki, Vol 13, No 9, 5 May 1971, pp 496-498

Abstract: A report is given on obtaining continuous laser emission in subsonic  
gas streams. Generation takes place due to CO<sub>2</sub> molecules excited by means of  
the transmission of energy from oscillatorily excited DF\* molecules obtained in  
the process of a chain reaction of deuterium with fluorine with purely chemical  
initiation. 2 figures. 2 bibliographic entries.

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Molecular Physics

USSR

UDC 621.378.335

BASOV, N. G., DANILYCHEV, V. A., POPOV, Yu. M.

"Induced Radiation in the Vacuum Ultraviolet Region"

Moscow, Kvantovaya Elektronika, No. 1, 1971, pp 29-34

Abstract: The possibilities of achieving generation in the vacuum region of the spectrum by the excitation of condensed noble gases by an electron beam are discussed. It is noted that the basic difficulty in producing generation in the short-wave portion of the spectrum is the absence of selective and sufficiently effective pumping sources for high energy levels and breakdown into a large number of radiation oscillators, which increases in proportion to the square of the frequency and leads to a decrease in the radiation lifetime. Other difficulties are wide radiation bands and fast relaxations of excited states. In an experiment with liquid xenon, generation was obtained at a wavelength of  $1760 \text{ \AA}$  through excitation by an electron beam with an energy of 800 kev. The threshold density of the current was  $30\text{-}50 \text{ a/cm}^2$ , the half-width of the generation spectrum was  $\sim 20 \text{ \AA}$ , and the direction of the radiation was  $\sim 7^\circ$ . Intense radiation of liquid xenon was also observed in the visible and near ultraviolet regions of the spectrum

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BASOV, N. G., et al, Kvantovaya elektronika, No. 1, 1971, pp 29-34

under the action of a powerful electron beam. Radiation in this range is attributed to transitions between upper excited states of the atoms and xenon molecules and to recombination through structural defects arising in the homogeneous liquid close to the point of the phase transition under the action of fast electrons. The radiation power in the vacuum region of the spectrum was of the order of  $10^3$  w. It is expected that this can be raised considerably through the application of a better geometry, high quality mirrors, and careful cleaning of the xenon. The authors feel that the excitation of condensed noble gases by a powerful electron beam opens up great possibilities for developing sources of coherent radiation in the vacuum region of the spectrum.

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Masers and Lasers

USSR

UDC: 621.373:530.145.6

BASOV, N. G., BELENOV, E. M., DANILEYKO, M. V., NIKITIN, V. V.

"Power Resonances and Frequency Stabilization of a Gas Laser With Nonlinear Absorption Cell"

V sb. Kvant. elektronika (Quantum Electronics--collection of works), No 1, Moscow, 1971, pp 42-52 (from RZh-Radiotekhnika, No 5, May 71, Abstract No 5D181)

Translation: The paper deals with the power resonances in gas laser emission due both to the effect of spectral line burnout (laser with a Fabry-Perot resonator) and to the interaction of modes at frequencies close to the centers of lines of amplification or absorption (laser with annular resonator). In the latter case, power resonances may be appreciably narrower and more contrasting than those in a laser with Fabry-Perot resonator. Data are given on stabilization of a helium-neon laser with Fabry-Perot resonator with respect to the peak of emission caused by saturation of methane absorption. Seven illustrations, bibliography of sixteen titles.

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USSR

UDC: 621.373:530.145.6

BASOV, N. G., GALOCHKIN, V. T., KULAKOV, L. V., MARKIN, Ye. P., NIKITIN, A. I., ORAYEVSKIY, A. N.

"A Chemical Laser Based on the Mixture  $D_2 + F_2 + CO_2$ "

Kratk. soobshch. po fiz. (Brief Reports on Physics), 1970, No 8, pp 10-14  
(from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12D226)

Translation: To produce emission on the mixture  $D_2 + F_2 + CO_2$ , the authors used the idea of creating a population inversion by transmitting excitation from a "hot" to a "cold" reaction product. With the ratio of  $D_2$  and  $F_2$  pressures equal to 0.9:0.9 mm Hg, the half-width emission pulse duration is ~3  $\mu$ sec. The addition of 0.1 mm Hg of  $CO_2$  to this mixture cuts the pulse duration in half, and when the pressure is increased to 0.3 mm Hg, emission is cut off on a wavelength of 4  $\mu$ , but emission appears on a wave of 10.6  $\mu$ . As the pressure rises further, the emission intensity of the pulse increases, reaching a maximum in the range of 1-2 mm Hg. The pulse duration of emission on activated  $CO_2$  molecules is 400  $\mu$ sec, i. e. it corresponds to the time of existence of chemiluminescence of excited  $DF^*$  molecules. The energy in the emission pulse on  $CO_2$  molecules increases in comparison with the emission energy of  $DF^*$  by a factor of 10, which corresponds to an increase in the quantum yield by a factor of 25. A. K.

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USSR

UDC: 621.385:530.145-6:53

BASOV, N. G., ZAKHAROV, S. D., KROKHIN, O. N., KRYUKOV, P. G., SENATSKIY, Yu. V., CHEKALIN, S. V., FEDOSIMOV, A. I., SHCHELEV, M. Ya.

"Investigation of Heating of a Plasma Formed by Ultrashort Laser Pulses"

Kratk. soobshch. po fiz. (Brief Reports on Physics), 1970, No 8, pp 48-52  
(from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12D464)

Translation: In order to form a plasma, ultrashort pulses of emission from a neodymium glass laser operating under conditions of self-synchronization of modes on a wavelength of  $1.06 \mu$  were focused on a target of LiD in a vacuum. The period between pulses was 15 nsec. The individual laser pulse is not simple, but rather consists of a series of peaks, the interval between them and the number of peaks varying from flash to flash. The overall pulse duration reaches 10 nsec, the duration of an individual peak being in the range of  $10^{-11}$ - $10^{-12}$  s. The output energy is  $\sim 0.1$  J. The diameter of the focal spot on the target is  $2 \cdot 10^{-2}$  cm. Heating of the plasma was studied by the methods of shadow photography and schlieren photography. A. K.

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USSR

BASOV, N. G., KOMPANETS, O. N., LETOKHOV, V. S. and NIKITIN, V. V.  
Physics Institute imeni P. N. Lebedev, Academy of Sciences, USSR

"Investigating Narrow Resonance Within the Dopler Line of Rotational-Oscillating Transitions of the SF<sub>6</sub> Molecule during Absorption Saturation"

Moscow, Zhurnal Eksperimental'noy i Teoriticheskoy Fiziki, Vol 59, No 2(8), 1970, pp 394-403

Abstract: Experimental measurement was made of the amplitude and width of narrow resonances within the Dopler line of rotational-oscillating transitions of the SF<sub>6</sub> molecule during the saturation of adsorption of a quasi-travelling wave from a CO<sub>2</sub> laser. The object of the experiment was to demonstrate the possibility of spectroscopy within the Dopler line by means of absorption saturation of a quasi-travelling wave. The effects of resonance widening were determined for the first time. The experimentally obtained large peak amplitude, along with its narrow width demonstrated the usefulness of the method for stabilizing the CO<sub>2</sub> laser frequency. The properties of a nonlinear spectroscope with a quasi-travelling wave are analyzed.

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1/2 040 UNCLASSIFIED PROCESSING DATE--23OCT70  
TITLE--BRANCHING REACTIONS AND CHEMICAL LASERS -U-  
AUTHOR--(05)-BASOV, N.G., MARKIN, E.P., NIKITIN, A.I., ORAEVSKY, A.N.,  
LEBEDEV, P.N.  
COUNTRY OF INFO--USSR, UNITED STATES  
SOURCE--IEEE J. QUANTUM ELECTRONICS, USA, VOL. QE-6, NO. 3, P. 183-4,  
MARCH 1970, SECOND CONFERENCE ON CHEMICAL AND MOLECULAR LASERS. DIGEST.  
DATE PUBLISHED----MAR70  
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TOPIC TAGS--CHEMICAL REACTION, HYDROGEN, FLUORINE, AMMONIA, CARBON  
DIOXIDE, CHEMICAL LASER  
CONTROL MARKING--NO RESTRICTIONS  
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UNCLASSIFIED

PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AT0123847

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ABSTRACT ONLY GIVEN, SUBSTANTIALLY AS FOLLOWS. THE AUTHORS DISCUSS THE PECULIARITIES OF POPULATION INVERSION WHICH OCCUR IN BRANCHED CHEMICAL REACTIONS AND EXPERIMENTAL RESULTS OBTAINED WITH MIXTURES H SUB2 PLUS F SUB2 AND HN SUB3 PLUS CO SUB2. FACILITY: PHYS. INST., MOSCOW, USSR.

UNCLASSIFIED

USSR

UDC 533.916

*B*  
BASOV, N. G., Academician, BOYKO, V. A., DROZHBIN, Yu. A., ZAKHAROV, S. M.,  
~~KROKHIN, O. N.~~, SKLIZKOV, G. V., and YAKOVLEV, Y. A., Physics Institute imeni  
P. N. Lebedev of the Academy of Sciences USSR, Moscow

"Investigation of the Initial Stage of the Gas-Dynamic Dispersion of a Laser  
Jet Plasma"

Moscow, Doklady Akademii Nauk SSSR, Vol 192, No 6, 21 Jun 70, pp 1248-1250

Abstract: Since previous experiments study the radiation spectra and gas-dynamic parameters of a plasma in large time intervals exceeding the length of the laser pulse, the present study covers the dynamics of the motion and the kinetics of ionization processes in a laser plasma with a high time resolution. It is noted that the gas-dynamic motion of a plasma accompanying the high-temperature heating of condensed material with focused laser radiation has been investigated because of the importance of the possible use of a laser plasma for thermonuclear fusion, as a source of multicharged ions for spectroscopic studies of astrophysical interest, for accelerator technology, etc. The study of the dispersion of a plasma during the action of a laser pulse and at distances  $r$  from the surface of the target comparable with the diameter  $d$  of the focusing spot of the laser radiation made it possible to trace different phases of the motion of the material,

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USSR

BASOV, N. G., et al, Doklady Akademii Nauk SSSR, Vol 192, No 6, 21 Jun 70, pp 1248-1250

including the initial stage of heating and the "freezing" of the ionization state of the plasma. The radiation of a neodymium laser with an energy of 10 j and a half-length of 15 nsec was focused with a 5-cm lens on the surface of a carbon target in a vacuum of  $10^{-6}$  torr, and the structure of the dispersing plasma was investigated on the basis of its luminosity. Space-time diagrams of ion dispersion were obtained from analysis of the data (see Fig.); for  $r \leq 1$  mm the plasma emits a continuous spectrum in the visible region (lines are observed only at distances  $r \geq 1$  mm). As the distance increases to 10 mm, a break is observed in the luminosity of ions CVI and CV from the target. The regions occupied by ions of different charges partially intersect, although there are no discontinuities in the density of material in the plasma. The following model of the gas-dynamic motion of the heated matter is constructed from an analysis of the experimental data: The plasma moves from the region of heating ( $r < d$ ), where the electron temperature  $T_e \sim 120$  ev on the basis of measurements of the recombination x-radiation, into the vacuum perpendicular to the surface with a velocity  $u \sim 6 \cdot 10^6$  cm/sec. In this region the velocity of the plasma is close to the speed of sound and the ion temperature corresponding to this

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USSR

BASOV, N. G., et al, Doklady Akademii Nauk SSSR, Vol 192, No 6, 21 Jun 70, pp 1248-1250

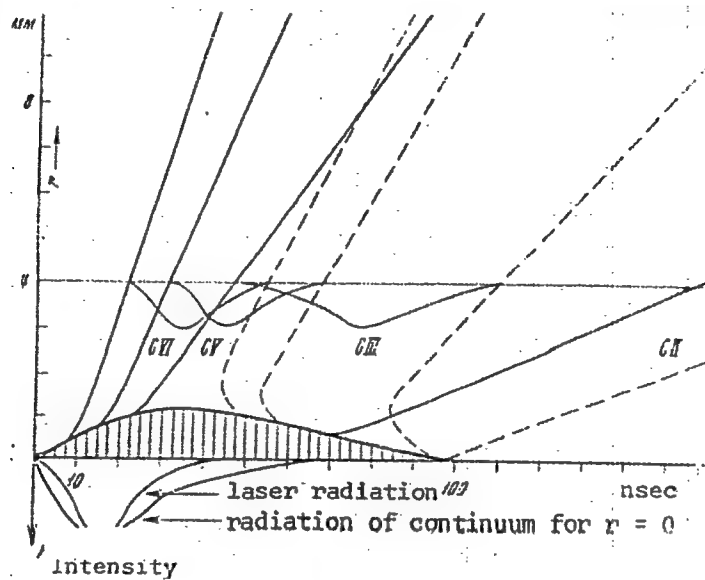
velocity is  $\sim 125$  ev. A considerable acceleration of the plasma is observed at distances  $r \leq 1$  mm. The velocity here is several times greater than the initial. The effect of "freezing" is obtained, since the density drops as  $u^{-1}r^{-2}$  along the trajectory of the ion and the recombination time becomes much greater than the characteristic dispersion time. In one process the freezing of the maximum degree of ionization occurs several nanoseconds after the beginning of the motion of the "elementary volume" of the plasma. This freezing process also occurs for the remaining ions. The laminar structure of the jet which is observed in photographs is explained on this basis. The energy lost by the plasma contained in the region  $r \leq d$  to radiation in the range 20-100 Å over a time of 40 nsec is estimated to be about 0.5 joule.

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USSR

BASOV, N. G., et al, Doklady Akademii Nauk SSSR, Vol 192, No. 6, 21 Jun 70, pp 1248-1250



$r$ - $t$  diagram of the dispersion of carbon ions at different times. Oscillograms

B  
USSR

BASOV, N. G., ORAYEVSKIY, A. N., SHCHEGLOV, V. A., Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR, Moscow

"Production of an Inverse Population of Working Gas Molecules in a Mixture With a Thermally Excited Auxiliary Gas"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, Vol 40, No 1, Jan 70, pp 173-180

Abstract: A model is proposed for calculating the kinetics corresponding to the interaction of a cold three-level working gas and a thermally excited two-level auxiliary gas. It is shown that there is an inverse population as a result of resonance exchange of quanta in the working gas. The limiting densities of the active molecules are calculated and the shape of the inversion pulse is determined. The oscillatory kinetics for a specific binary  $\text{CO}_2\text{-N}_2$  mixture is discussed. A relationship is obtained between the density of the inverse population and the initial excitation temperature, the temperature of the gas mixture, and the partial pressures of the components of the initial mixture. It is shown that in this case one can achieve efficiencies 3-4 times higher than the limiting efficiencies achieved using thermal excitation. This is attributed to the fact  
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USSR

BASOV, N. G., et al., Zhurnal Tekhnicheskoy Fiziki, Vol 40, No 1, Jan 70, pp 173-180

that in obtaining the inverse population of working gas molecules in a mixture with thermally excited gas carriers, the energy expended goes only into thermal excitation of the internal degrees of freedom of the auxiliary gas. It is noted that a theoretical study will require further analysis.

USSR

**B**  
BASOV, N. G.; ZUYEV, V. S.; et al (Lebedev Physics Institute, USSR Academy of Sciences, Moscow)

"High-Current Discharge in Gases: 1. Experimental Study of Optical and Energy Characteristics of a Powerful Discharge in Air" (first of a two-part series)

Leningrad, Journal of Technical Physics; March, 1970; pp 516-22

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ABSTRACT: A high-current discharge in air ( $\sim 400$  ka) with an energy in the discharge channel up to 25 kilojoules for a period of  $2 \cdot 10^{-5}$  seconds was studied experimentally. The current and voltage, expansion rate of the channel, and the absolute radiation intensities for various frequencies were measured, making it possible to determine the energy balance in the discharge. With a channel expansion rate of 2 to 2.5 km/sec the radiation spectrum of the discharge column corresponds to the radiation spectrum of a black body with a temperature varying from 2 to 4 electron volts for 20  $\mu$ sec. The discharge can be used as a high-intensity source of radiation.

The article includes 7 figures. There are 7 references.

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AP0024240-

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UR9012

TITLE-- SCIENCE AND TECHNICAL PROGRESS

NEWSPAPER-- PRAVDA, FEBRUARY 4, 1970, P 1, COLS 2-7, AND P 2, COLS 1-5

ABSTRACT-- A DIGEST OF SPEECHES, READ BY M. V. KELDysh AND N. G. BASOV AT THE GENERAL ASSEMBLY OF THE ACADEMY OF SCIENCES, U.S.S.R., FEBRUARY 3, 1970, IS GIVEN.

THE ASSEMBLY WAS ATTENDED BY P. N. DEMICHEV, SECRETARY OF THE CENTRAL COMMITTEE OF THE PARTY, M. S. SOLOMENTSEV, SECRETARY OF THE CENTRAL COMMITTEE OF THE PARTY, V. A. KIRILLIN, DEPUTY CHAIRMAN OF THE COUNCIL OF MINISTERS AND CHAIRMAN OF THE STATE COMMITTEE FOR SCIENCE AND TECHNOLOGY, AND S. P. TRAPEZNIKOV, HEAD OF THE DEPARTMENT OF SCIENCE AND SCHOOLS OF THE CENTRAL PARTY COMMITTEE.

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Abstracting Service:

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5-40 UR0057

A70-25112 # Obtaining population inversion of the molecules of the working gas in a mixture with a thermally excited auxiliary gas (Poluchenie inveranoi naselennosti molekul rabocheho gaza v smesi s termicheski vzbuzhdennym vspomogatel'nym gazom). N. G. Basov, A. N. Oraevskii, and V. A. Shcheglov (Akademiia Nauk SSSR, Fizicheskii Institut, Moscow, USSR). Zhurnal Tekhnicheskoi Fiziki, vol. 40, Jan. 1970, p. 173-180. 8 refs. In Russian.

Calculation of the kinetics of the interaction between a 'cold' (three-level) working gas and a thermally excited (two-level) auxiliary gas within the framework of a model representation. It is shown that population inversion occurs in the working gas, due to resonance quantum exchange. The maximum densities of the 'active' molecules are calculated, and the inversion pulse shape is determined. The vibrational kinetics for the carbon dioxide/nitrogen system are investigated. The dependences of the population inversion on the initial excitation temperature, the temperature of the gas mixture, and the partial pressures of the components of the initial mixture are determined. The population inversion efficiency is calculated. A.B.K.

REEL/FRAME

19790465



USSR

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UDC 534.1

CHIRKIN, N. M., VLASOV, A. B., BASOV, V. G.

"Problems in the Design of Resonators for Hypersonic Excitation in Piezo-electric Crystals"

Kiev, Izvestiya VUZ -- Radioelektronika, Vol 13, No 7, 1970, pp 879-883

Abstract: Papers published on the excitation of hypersonic oscillations in piezoelectric crystals using uhf do not discuss the requirements applicable to such resonators nor do they consider the problems of their optimization. The purpose of the present brief communication is to develop criteria for choosing an optimal resonator which permits an increase of the transformation factor of one or two orders above the  $10^{-3}$  to  $10^{-4}$  level given in previous papers. The authors derive a factor  $G$ , which is equal to the product of the characteristic figure of merit of the resonator (the losses in the dielectric equivalent of the sound conductor taken into account) and the filling factor of the resonator, which is a function of the equivalent capacitance of the electroacoustic converter.  $G$  is the measure of the resonator's efficiency and should be as large as possible. The authors also consider several resonator designs for providing larger values of  $G$ . Analyzing these designs, they find that their analysis agrees with the experimental data. A few details of the experimental equipment and method are given.

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1/2 016 UNCLASSIFIED PROCESSING DATE--30OCT70  
TITLE--ELECTROCHEMICAL BEHAVIOR OF A VANADIUM ELECTRODE AND OF ITS  
POSSIBLE USE IN COULOMETRIC TITRATION -U-  
AUTHOR--(03)--KOSTROMIN, A.I., AGASYAN, P.K., BASOV, V.N.  
COUNTRY OF INFO--USSR  
SOURCE--ZH. ANAL. KHIM. 1970, 25(2), 216-19  
DATE PUBLISHED--70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--METAL ELECTRODE, VANADIUM, ELECTROCHEMISTRY, TITRATION  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRA--2000/2178 STEP NO--UR/0075/70/025/002/0216/0219  
CIRC ACCESSION NO--AP0125758  
UNCLASSIFIED

2/2 016

UNCLASSIFIED

PROCESSING DATE--30UCT70

CIRC ACCESSION NO--AP0125758

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ANODIC BEHAVIOR OF A V ELECTRODE IN SOLNS. OF VARIOUS ACIDS AND ALKALIES OF DIFFERENT CONCNS. WAS STUDIED BY CONSTRUCTING CURVES OF THE DEPENDENCES  $I$  EQUALS  $F(E)$  AND  $E$  EQUALS  $F(I)$ . THE PRODUCTS OF ANODIC POLARIZATION OF THE V ELECTRODE IN AN ACID MEDIUM ARE  $V(III)$  AND  $V(IV)$ ; THEIR FORMATION AND THE EFFICIENCY OF THEIR GENERATION CURRENT ARE A FUNCTION OF THE C.D. AND THE ACIDITY OF THE MEDIUM. AFTER ANODIC DISSOLN. OF V IN ALK. SOLNS.,  $V(V)$  COMPS. ARE FORMED WITH A 100PERCENT CURRENT EFFICIENCY IN A WIDE RANGE OF ALKY. OF THE MEDIUM AND C.D. OPTIMUM CONDITIONS OF ELECTROGENERATION OF INTERMEDIATE PRODUCTS FROM METALLIC V ARE:  $V(VI)$ , 0.1N H SUB2 SO SUB4, C.D. SMALLER THAN OR EQUAL TO 15 MA-CM PRIME2; AND  $V(V)$ , SMALLER THAN OR EQUAL TO 0.1N NaOH, C.D. LARGER THAN OR EQUAL TO 2 MA-CM PRIME2. FACILITY: KAZAN. STATE UNIV., KAZAN, USSR.

UNCLASSIFIED

UDC: 621.327.52

USSR

SYSUN, V. V., ~~BASOV, Yu. G.~~, ROLDUGIN, V. I.

"A Gas-Discharge Light Source"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obratzsy, Tovarnyye Znaki, No 11, Apr 72, Author's Certificate No 333630, Division H, filed 30 Jul 70, published 21 Mar 72, p 210

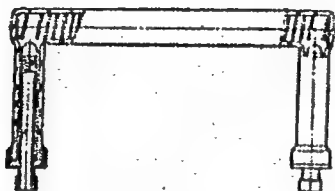
Translation: This Author's Certificate introduces: 1. A gas-discharge light source which contains electrode units built into a discharge tube filled with working gas. The tube is made of an optically transparent material, and the walls contain and stabilize the discharge channel. As a distinguishing feature of the patent, the maximum specific energy of the discharge is increased by increasing the surface containing the plasma. Mounted inside the discharge section of the tube is a helix of optically transparent material whose longitudinal axis coincides with that of the discharge channel. 2. A modification of this light source distinguished by the fact that the turns of the helix have their lateral surface in contact with the walls of the discharge section of the tube. 3. A modification of the source covered in points 1 and 2 distinguished by the fact that at least two-thirds of the wall surface of the discharge section of the tube are shaded by the helix. 4. A modification of the source covered in point

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SYSUN, V. V. et al., USSR Author's Certificate No 333630

1 distinguished by the fact that the helix is made of a more refractory material than the discharge tube, e. g. of fused quartz.



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USSR

UDC 576.858.75.095.57

PODCHERNYAYEVA, R. Ya., SOKOLOV, M. I., PARASYUK, N. A., MYASHNIKOVA, I. A.,  
BASOVA, E. A., SOKOLOVA, N. N., and MOLIBOG, Ye. V., Institute of Virology  
imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR

"Study of Genetic Markers and Their Variability in Influenza Virus Isolated  
During the 1968-1969 Influenza Epidemic. II. Variability of Genetic  
Markers in Influenza Type A<sub>2</sub> (Hongkong) Virus In Passages in Mice at Low  
Temperatures"

Moscow, Voprosy Virusologii, No 5, 1971, pp 543-548

Abstract: Ten passages of influenza type A<sub>2</sub> (Hong Kong) virus in mice re-  
sulted in variants that produced lung changes typical of influenza in mice.  
After the 20th passage, the pathogenic variants exhibited increased repro-  
ductive activity at 36 and 40°C. All strains, except A<sub>2</sub> (Hong Kong) 1/68  
M<sub>20</sub>, resisted heating to 56°C. Like the original strains, they were com-  
pletely adsorbed on chick erythrocytes but were more readily eluted from  
them. Neuraminidase activity was half that in the original strains. The  
pathological variants remained sensitive to normal animal serum inhibitors  
and did not agglutinate mouse erythrocytes. They resembled the original  
strains in resistance to trypsin, urea, and ultraviolet irradiation.

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PODCHERNYAYEVA, R. Ya., et al., Voprosy Virusologii, No 5, 1971, pp 543-548

After 10 passages of A2 (Hong Kong) 1/68 and its pathogenic variant. A2 (Hong Kong) 1/68 M<sub>20</sub> in chick embryos incubated after inoculation at 28°C both strains reproduced actively and remained able to do so even at 40°C.

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UNCLASSIFIED

PROCESSING DATE--16OCT70

TITLE--EXAMINATION OF THE RESISTANCE OF THE PURIFIED PREPARATION OF THE  
HYPOTHALAMIC FACTOR STIMULATING THE DISCHARGE OF THE LUTEINIZING HORMONE

AUTHOR--(02)-BASOVA, G.G., GINODMAN, L.M.

COUNTRY OF INFO--USSR

B

SOURCE--PROBL. ENDOKRINOL. 1970, 16(2), 68-72

DATE PUBLISHED-----70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--PITUITARY HORMONE, PROTEOLYTIC ENZYME, CHEMICAL REACTION,  
AMINO ACID

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRA--1996/0601

STEP NO--UR/0502/70/016/002/0068/0072

CIRC ACCESSION NO--AP0117829

UNCLASSIFIED



2/2 019

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0117829

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. THE ACTIVITY OF THE LH RELEASING (LR) FACTOR WAS LOST AFTER INCUBATION WITH ENDOPEPTIDASES (PEPSIN, CHYMOTRYPSIN, AND TRYPSIN) AND DID NOT CHANGE AFTER INCUBATION WITH EXOPEPTIDASES (CARBOXYPEPTIDASES A, AND N, AND LEUCINAMINOPEPTIDASE). THE LOSS OF THE ACTIVITY AFTER TRYPSIN TREATMENT INDICATES THAT ARGININE AND LYSINE ARE INCLUDED IN THE PEPTIDE FRAGMENTS. ABSENCE OF THE AMINO ACIDS ON THE END OF PEPTIDE FRAGMENT MIGHT BE AN EXPLANATION FOR THE PERSISTENCE OF THE LR FACTOR ACTIVITY AFTER THE INCUBATION WITH EXOPEPTIDASES.

MOSCOW, USSR.

FACILITY: INST. EKSP. ENDOKRINOL. KHIM. GORMON.,

UNCLASSIFIED

USSR

UDC 615.371.015.13

LEVI, M. I., BASOVA, N. N., and DURIKHIN, K. V., Moscow Municipal Disinfection Station and Central Institute of Epidemiology

"Relationship Between the Dose of Soluble Antigen and the Plasma Cell Reaction in a Regional Lymph Node After Primary Immunization (A Mathematical Model)"

Moscow, Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii, No 10, 1972, pp 19-25

Abstract: The dose of soluble antigen injected into the organism determines the plasma cell reaction in a regional lymph node. The accumulation of cells of the plasmacyte series is directly proportional to the square of the logarithm of the dose of antigen injected. The main elements of the primary immune response of animals to the injection of soluble antigen (logarithm of the antigen dose, duration of stay at the injection site, accumulation of plasma cells, specific rate of removal of antigen from the injection site, modulus of transition from antigen to plasma cells) can be related by fairly simple equations, which make up the suggested mathematical model. The differences between the organism's response to injection of the same soluble antigen in one place and in different places can be explained by the quantitative patterns of the plasma cell reaction. In an experiment with white rats, injection of Past.

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USSR

LEVI, M. I., et al., Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii,  
No 10, 1972, pp 19-25

pestis capsular antigen in sorbed form or mixed with incomplete Freund's  
adjuvant markedly decreased the specific rate of absorption of the antigen from  
the injection site and increased proportionately the number of plasma cells in  
the regional lymph nodes.

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USSR

UDC 615.373:616.927-078.73

TENDETNIK, Yu. Ya., BASOVA, N. N., and STANISLAVSKIY, Ye. S., Central Institute of Epidemiology and Moscow Institute of Vaccines and Sera imeni Mechnikov

"Erythrocyte H(d)-Diagnosticum and Its Use in the Passive Hemagglutination Reaction in Typhoid Fever"

Moscow, Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii, No 9, 1971, pp 129-133

Abstract: Soluble H(d) antigen was obtained from deflagellated *Salmonella muenchen* and *Salmonella mission* cells. The H(d) diagnosticum was prepared by sensitizing sheep erythrocytes with the soluble antigen. The diagnosticum proved to be highly sensitive and quite specific in the passive hemagglutination reaction with sera obtained from typhoid patients and from patients with other infectious diseases (pneumonia, influenza, tuberculosis, dysentery, and so forth) as well as with sera from healthy persons. The sera from healthy persons and from patients with diseases other than typhoid reacted weakly with the diagnosticum (most of the titers did not exceed 1:160). On the other hand, the erythrocyte H(d) diagnosticum was highly active in the hemagglutination reaction with sera from typhoid patients; the titer was 1:640 or more in over 75% of the cases.

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